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(54) Improvements relating to microwaveable packaging for foodstuff

(57) Packaging for foodstuff to be cooked in a microwave oven has susceptor material which heats up due to microwave interaction and can therefore conduct heat to the foodstuff for example to brown or crisp same, which cannot be achieved by microwave action alone. The packaging 20X is constructed so that in a first area thereof, there are two overlapping but discrete layers of the susceptor material 24X, 26X shaped to be wider at the centre of the overlap than at the ends so that such area heats up more intensely than a second area of the packaging which surrounds the first area to apply more intense local heat to a part of the foodstuff requiring such heat.

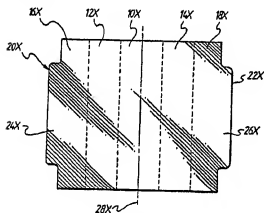
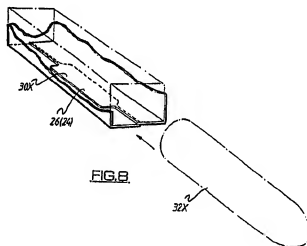


FIG. 7



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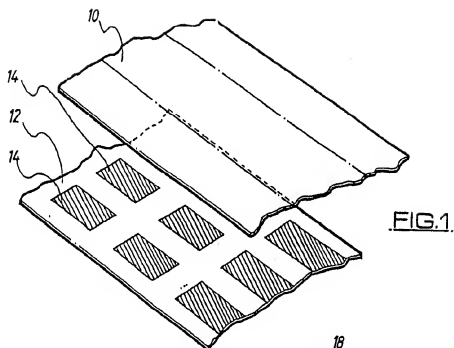


FIG. 1

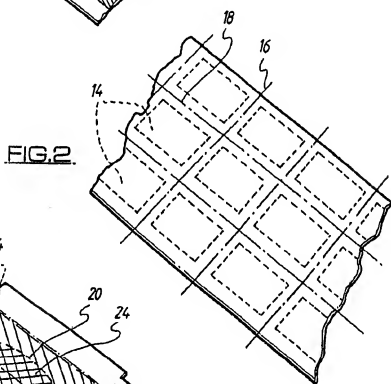


FIG. 2

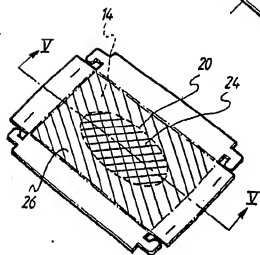


FIG. 3

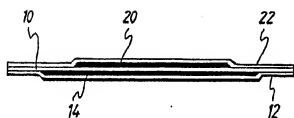


FIG. 5

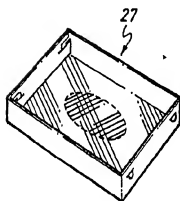


FIG. 4

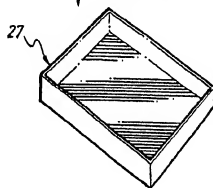
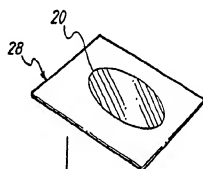
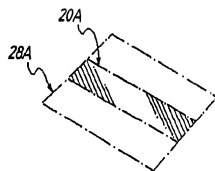


FIG. 6

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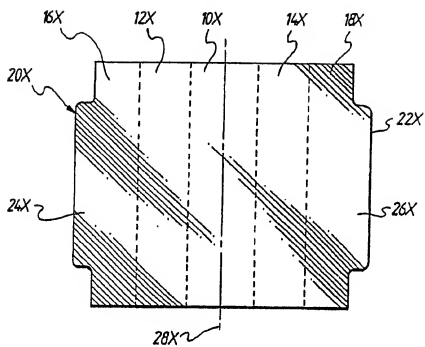


FIG. 7

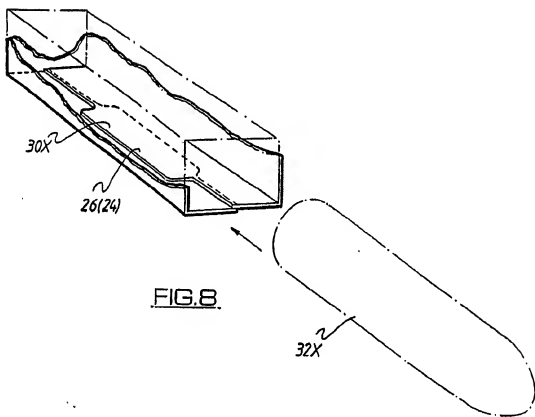


FIG. 8

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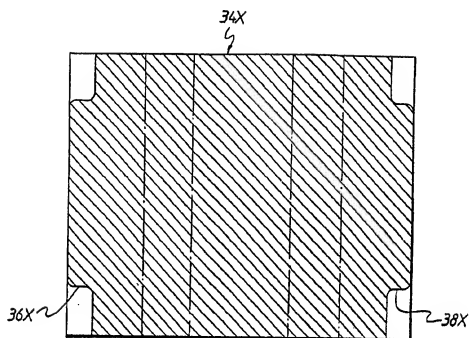


FIG. 9

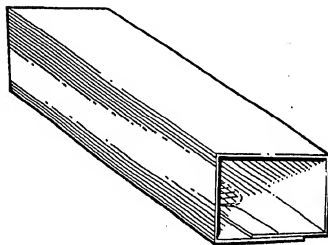
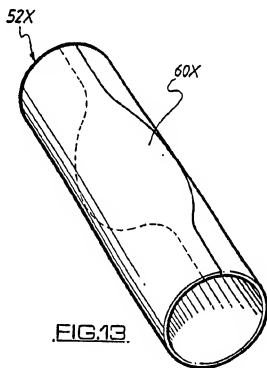
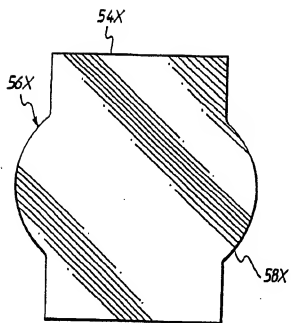
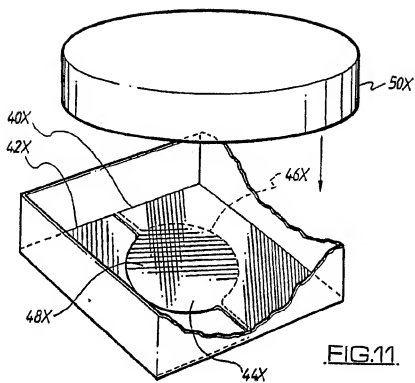


FIG. 10



Improvements Relating to Microwaveable Packaging for Foodstuff

This invention relates to microwaveable packaging for foodstuffs to be heated in a microwave oven.

The packaging, mainly containers can be used for other products, but as by far they will be used mostly for foodstuff, reference will be made hereinafter only to foodstuff.

When microwave heating certain foodstuff, it is often a requirement that the surface of the foodstuff should be browned or crisped in order to give the foodstuff the appearance of having been cooked by more conventional forms of cooking such as roasting or frying, and to achieve this susceptor materials have been developed. A susceptor material is a material which heats up rapidly under the influence of microwave energy, and if the foodstuff is located in contact therewith or adjacent thereto, it receives heat by conduction to its surface which gives rise to a browning or crisping effect, whilst the remainder of the foodstuff is being heated throughout by conventional microwave effect.

Susceptor materials typically comprise layers of conductor particles, usually metal, and there is some criticality in the thickness of the metallic layer and its composition.

An indication of susceptor layer theory and application is given in British Patent No. 2,046,060, but it is not possible to put strict limits on susceptor layer thickness.

Conventional practise furthermore has suggested that the susceptor material particles should be vacuum deposited on a

plastics material film, and the film laminated to a substrate such as a sheet of paper or carton board with the metallic layer between the plastics film and the substrate, so that it will in fact be isolated from the foodstuff, assuming the foodstuff to be for positioning in contact with or adjacent the plastic material film.

It is to be mentioned that susceptor layers need not be formed and produced by vacuum deposition. They may for example be applied by printing techniques as disclosed in European Patent Application No. 0,276,654, and as mentioned above the conductive particles need not be metallic. They could be for example graphite particles or a mixture of particle types.

As stated herein, the susceptor layers are embodied in containers for foodstuff such as sleeves, trays, boxes, wrappings and the like, and it is known to take steps to ensure that heat is applied from the susceptor layer to the foodstuff only in required locations on the foodstuff, for example on the base in the case of a pizza.

However, even the selective heating of regions of the foodstuff has not provided the complete answer, and it has been recognised that within an area of the susceptor heating material, there is still a need and desire to provide a certain amount of differential heating. That is to say for example if the base region of a pizza is to be heated by susceptor material to crisp and brown same, there may still be a requirement to have a central region of greater heating than the periphery, and susceptor materials have to be organised to provide this effect.

Various attempts have been made to provide these so-called differential heaters, and one method is disclosed in our

European Patent Application No. 0327243, wherein the susceptor material is treated by mechanical embossing so as to reduce the heating effect where embossing has been applied, and to leave an unembossed region which will heat up to a greater extent than the remainder of the susceptor layer under the influence of microwaves.

Another method of providing a differential heating arrangement is to apply extra layers of susceptor material in a selective region or selected regions of previously applied layers, as described in European Patent Application No. 0276654.

The present invention is concerned with the provision of the increased heating effect and provides a general and several specific concepts for achieving same in an improved manner.

According to the invention there is provided packaging for foodstuff for the heating of same by microwave cooking, comprising sheet material sections having susceptor material therein, of which sections the edges are overlapped so that the said sections define a surface against which the foodstuff rests to be heated, and wherein the susceptor material at said edges is shaped so as to define a first area in which the susceptor material of said sections are overlapped so that said first area will heat up to a greater extent than a surrounding area in which said susceptor material of the section are not overlapped and wherein said first area is of greater width at the centre of the overlap length than at the ends.

Preferably, at least one of said overlapped edges is shaped to provide that said area is of greater width at the centre of the overlap length than at the ends. Each of said edges may be so shaped.

Preferably also, the said shaping comprises providing a bulbous convex portion on each edge, so that when the edges overlap, the said area defines an oval or circle. The packaging may be a sleeve of paper provided with susceptor material and for example, the sleeve may be made from a blank of cut and creased material, covered overall with susceptor material.

To secure the overlapped edges together, gluing or locking may be employed.

The susceptor material layers can be laid down in any convenient fashion, although vacuum deposition of plastics material films and the printing or coating described herein are likely to be used most widely.

The present invention provides packaging which can provide that the susceptor material is located so as to give a concentrated heating effect in a particular area, for example in the base of a pizza in the central region thereof, it having been noted in using conventional containers for heating pizzas, French bread and the like, that at the conclusion of heating, the central base region of the foodstuff remains soft and soggy.

The present invention in said other embodiment aims to provide packaging which is simple and easy to produce and embodies susceptor material in a fashion providing for the avoidance of the above mentioned disadvantage or the reduction of same.

It will be understood that the invention may be embodied in trays and box containers by suitable design thereof.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which Figs 1 to 6 show arrangements which are useful for reference but show embodiments in the invention claimed in co-pending application No 9123934.3 from which the present application is divided and Figs 7 to 13 show embodiments of the present invention. In the drawings;-

Fig. 1 is a perspective view to illustrate the formation of laminated material;

Fig. 2 shows the laminated material of Fig. 1;

Fig. 3 is a perspective view of a blank produced from laminated material;

Fig. 4 is a perspective view of the blank of Fig. 3 in erected condition;

Fig. 5 is a sectional elevation taken on line V-V in Fig. 3;

Fig. 6 is a perspective view similar to Fig. 4 but showing an alternative arrangement.

Fig. 7 is a plan view of a blank erectable into a container according to an embodiment of the present invention;

Fig. 8 shows the container of Fig. 7 in erected condition and also shown is a French bread stick to be microwave heated in the container;

Fig. 9 is a view similar to Fig. 7 but shows in a modified arrangement;

Fig. 10 shows the container of Fig. 9 in erected condition;

Fig. 11 shows a container according to a further embodiment of the present invention;

Fig. 12 is a blank for erection into a container according to yet a further embodiment of the present invention; and

Fig. 13 shows the container of Fig. 12 in erected condition.

Referring to the drawings, in Fig. 1 are shown two sheet materials, namely a substrate material 10 which may be of paper or carton board, and a film 12 forming a carrier film for patches 14 of susceptor material applied thereto by any suitable method. In use the films 10 and 12 are laminated together to form the arrangement shown in Fig. 2. The patches 14 are evenly spaced so that the resulting laminate of Fig. 2 can be cut and creased into individual blanks each having a patch 14. The sub-division lines to provide the individual blanks are indicated generally by reference numerals 16 and 18.

On the opposite side of the substrate 10 is laminated a second film similar to film 12 with individual patches of susceptor material thereon somewhat similar to patches 14, except that the second patches are of smaller size than patches 14, and are of a different shape, but they are in register with patches 14.

Fig. 3 in fact shows a blank which is formed from the resulting material, and the second patch of susceptor material is indicated by reference 20, and it will be seen to be elliptical and to lie centrally of the patch 14 which is also present in the blank.

The arrangement is also well illustrated in Fig. 5 wherein it

will be seen that the patches 20 and 14 lie to opposite sides of the substrate 10, and the covering films 12 and 22 cover the susceptor material patches 14 and 20 to prevent any contact between the susceptor patches 14 and 20 and the foodstuff which comes into close proximity with the blank.

It should be mentioned that the second film 22 can be applied over the first film 12 i.e. to the same side of the substrate 10 as the film 12. Or the susceptors can be reversed i.e. susceptors 20 on the bottom and susceptors 14 on the top of the substrate.

Reverting to Fig. 3, it will be understood that by overlapping the susceptor patches 14 and 20, there is created a central elliptical area or region 24 of high heat generation capacity, and a surrounding region 26 where the susceptor patch 14 only exists, which is a region of low heat generation capacity, both of said regions being in the base of the resulting tray which can be erected from the blank shown in Fig. 3, such tray being illustrated at 27 in Fig. 3. It will be understood that the side panels and locking tabs shown in Fig. 3 in the blank are simply erected and interfitted in conventional fashion.

In use, when a foodstuff item is placed in the tray 26, and is subjected to microwave heating, there will be a region of increased heating effect, region 24, whilst a lesser heating effect will be created by region 26. It has been found for many foodstuff products that this differential heating arrangement is highly desirable.

Instead of the resulting article as shown in Fig. 3 being a tray, it may also have a top so that it will in fact be a closed box. Furthermore, instead of providing both films with patches 14, 20 of susceptor, which has production

difficulties, one of the films may be provided all over with susceptor material.

Again, instead of having two films as shown, there may only be one film say film 12 with patches or overall cover of metallised susceptor, whilst the second susceptor patches 20 could be provided by applying printed portions or strips of printing or other coating as set forth for example in said European Application, such susceptors being applied before or after the sheet 10 is cut into blanks. The application of strips of liquid susceptor composition is particularly simple. Thus, in this preferred case the substrate is covered on one side with film which is overall vacuum metallised or is patched as shown, and to the other side are applied strips of liquid susceptor composition at selected positions, and then the substrate 10 is cut and creased to provide the appropriate blanks.

As indicated in said co-pending application it will be appreciated that many manifestations of the arrangement are possible and one variation is shown in Fig. 6 wherein the tray 27 is formed from material simply as shown in Fig. 2 i.e. without the second susceptor material patches applied thereto, and the second susceptor material patches 20 are carried by another substrate which is cut into inserts 28 which can be positioned inside the tray, the insert 28 being of the same shape as the tray base so that the patch 20 will be held in the correct disposition in relation to the first susceptor layer in the base of the tray.

The invention the subject of said co-pending application provides a convenient and ready means for arranging for differential heating in packaging containers whilst keeping the susceptor material of the layers separate, which greatly facilitates manufacture.

It is possible furthermore to provide on an insert such as 28 shown in Fig. 6, that the two susceptor patches are carried by that insert which can simply be dropped into a tray or container to provide the resulting differential heating effect as described herein.

Fig. 6 also shows that an alternative form of insert 28A may be provided wherein the second susceptor is in the form of a strip 20A applied to the insert 28A by in liquid form by coating, printing or the like.

It should be mentioned that the first and second susceptor layers can be located to the same side of the substrate or to opposite sides as described herein, and the first and second substrate layers may be oppositely arranged. That is to say the first susceptor layer may be arranged to the inside of the container, and the second susceptor layer to the outside, which is opposite to that described in relation to Fig. 4.

The present invention aims at achieving a similar effect to that described in relation to Figs. 1 to 6, hence their use for background information and referring now to Figs. 7 to 13 of the drawings which show embodiments of the present invention, in Fig. 7 a blank of cardboard material is provided with creasing so as to define a top panel 10X, side panels 12X, 14X and base panels 16X and 18X. The blank is covered overall with susceptor material, in any suitable manner, for example as set forth in British Patent No. 2,046,060 or European Patent Application No. 0276654, to which reference is made.

The blank of Fig. 7 is foldable about the hinge lines shown in dotted lines to the sleeve configuration shown in Fig. 8 so that the susceptor material lies to the inside of the

sleeve.

The side of base panel 16X and 18X as indicated at 20X and 22X are contoured so as to define projecting portions 24X and 26X which are symmetrically arranged in relation to the centre line 28X of the blank, so that when the blank is erected as shown in Fig. 8, the projections 24X and 26X overlap and define centrally of the overlap length a region 30X which is of double thickness and more particularly has two layers of susceptor material. Region 30X is wider at the centre of the overlap length than at the ends. When such a sleeve is subjected to microwave heating therefore, the region 30X will heat up to a greater extent than the remaining interior area of the container. This is particularly suitable for the product 32X, a French bread stick to be held in the sleeve whilst in a microwave oven, as the hotter region 30X will ensure that the underside central region of the bread stick 32X is heated to avoid the result which usually takes place that the central underside of the bread is soft and soggy.

The overlapping sides 20X and 22X may be secured together by suitable means such as adhesive, which preferably is unaffected by microwave energy, product weight or high temperature or by means of a conventional carton lock arrangement. If appropriate, it may not be necessary to provide any interconnection between the overlapping base panels 16X and 18X.

In the embodiment of Fig. 7, the edges 20X and 22X are shaped and the susceptor material extends over the entire blank, but it is not necessary that this should be so for the same effect to be achieved. Thus, in Fig. 9, the blank 34X is of rectangular configuration, and the edge regions of the susceptor material are shaped as at 36X and 38X in effect to

define the same wide double thickness susceptor material area as in th Fig. 7 embodiment, when the blank of Fig. 9 is folded into the sleeve as shown in Fig. 10.

In the arrangement of Fig. 11, the container is in the form of a tray (it could be a closed carton) having hingeable base panel sections 40X and 42X which are provided with the shaped edge regions 44X and 46X so that a double layer, wide central region 48X is created in the base of the container so that if a pie 50X to be cooked in the microwave oven whilst in the container requires its bottom central region to be heated more than other regions, the double susceptor area 48X will perform the function. The base panels 40X and 42X may simply be hinged to the respective sides of the container and may be folded downwards so as to overlap as shown in Fig. 11.

The container shown in Fig. 13 is a round sleeve 52X, and is formed from a blank 54X of the shape shown in Fig. 12. The blank is overall covered with susceptor material, and to form the container of Fig. 13 it is simply wound into tubular form so that the contoured edges 56X and 58X overlap so as to provide the wide double thickness susceptor area 60X in the finished container as shown in Fig. 13. It is to be noted that although the hatching lines representing the susceptor material are shown on the outside of the container in Fig. 12, it is preferred that susceptor material be located to the inside of the sleeve.

It will be appreciated that many other embodiments of the invention are possible, provided that within the container there result overlap portions of susceptor material which define a wide central region on the overlap where the generated heat as a result of microwave energy will be greater than in other areas of the container.

The susceptor material can be applied indeed so as to be present on the container only in those shaped regions which overlap.

The susceptor material may be applied to the blank or container by any suitable method such as by printing, transfer metallising processes, patching or laminating.

It is usual to cover the susceptor material with plastic film, described for example in said British Patent No. 2,046,060, so as to keep the foodstuff out of contact with the actual susceptor material which may be metallic and/or graphite particles. In any case where the susceptor is applied as a liquid composition, it is subsequently dried, and preferably will be covered by a film or paper layer to protect same.

CLAIMS

1. Packaging for foodstuff for the heating of same by microwave cooking, comprising sheet material sections having susceptor material thereon, of which sections the edges are overlapped so that the said sections define a surface against which the foodstuff rests to be heated, and wherein the susceptor material at said edges is shaped so as to define a first area in which the susceptor material of said sections are overlapped so that said first area will heat up to a greater extent than a surrounding area in which said susceptor material of the section are not overlapped and wherein said first area is of greater width at the centre of the overlap length than at the ends.

2. Packaging according to Claim 1, wherein at least one of said overlapped edges is shaped to provide that said area is of greater width at the centre of the overlap length than at the ends.

3. Packaging according to Claim 2, wherein each of said edges is shaped to provide that said area is of greater width at the centre of the overlap length than at the ends.

4. Packaging according to Claim 2, wherein the said shaping comprises providing a bulbous convex portion on each edge, so that when the edges overlap, the said area defines an oval or circle.

5. Packaging according to any of Claims 1 to 4, wherein the packaging is a sleeve of paper provided with susceptor material.

6. Packaging according to Claim 5, wherein the container is in the form of a sleeve made from a blank of cut and creased

material, covered overall with susceptor material.

7. Packaging according to any of Claims 1 to 6, wherein the overlapping edges are secured together by gluing or by locking.

8. Packaging for foodstuff for the heating of same by microwave cooking substantially as hereinbefore described with reference to the accompanying drawings.

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Relevant Technical Fields

(i) UK CI (Ed.N) H5H (HMB, HMK, HMP)

(ii) Int CI (Ed.6) B65D 81/34

Search Examiner
J COCKITT

Date of completion of Search
7 OCTOBER 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1-8

(ii)

Categories of documents

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	EP 0365247 A2	(BECKETT) see Figures 2-4 and column 5 lines 16-57	1 at least
X	US 4916279 A	(JAMES) see Figures 6, 7	1 at least
A	US 4780587 A	(JAMES)	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).